The MAC Flyer

JANUARY 1977

Twenty Years of Hercules

MILITARY AIRLIFT COMMAND
GEN PAUL K. CARLTON Commander
LT GEN JOHN F. GONGE Vice Commander
BRIG GEN WILLIAM E. CARSON Inspector General
COL EMERY J. CRANE Director of Safety

The MAC Flyer

For Greater Efficiency
in MAC Air Operations

THE STAFF
LT COL JOHN W. RAY Supervising Editor
MAJ ORLEN L. BROWNFIELD Associate Editor
CAPT BRUCE L. GUMBLE Associate Editor
ISOBEL M. BRYANT Managing Editor
BRIAN L. GAUSS Art Director

JANUARY 1977 MACRP 127-5 VOL XXIV, NO. 1

12

21

24

The Legend of Hercules 3
The Way It Was and The Way It Is 7
Illusion of Danger 8
Decompression Sickness—
It Can Make Your Blood Boil 10
Good Show 11
Interview With a Master Test Pilot . . . 12
A New Year and Some Current Ideas . . . 16
Everything's Up-to-Date
in Kansas City 18
The SOD 21
C. R. Terror 24
Quick Stoppers 28

THE MAC FLYER is published by the Directorate of Safety, Headquarters Military Airlift Command. The contents are informative and not regulatory or directive. All names in accident stories are fictitious and no information concerning aircraft accidents may be construed as incriminating under Article 31, UCMJ.

Contributions, comments, and criticisms are welcome. Write: The Editor, THE MAC FLYER, MAC/IGFE, Scott AFB, IL 62225, or call: (618) 256-3534, Autovon 638-3534. The editor reserves the right to change manuscripts to improve them or correct technical errors.

The magazine is available from: The Superintendent of Documents, Government Printing Office, Washington, DC 20402. Price 70 cents per copy, $7.90 per year ($9.90 foreign).

Distribution F, X; OPR MAC/IGFE.

Flyer Call

This month's issue of THE MAC FLYER is dedicated to the indomitable C-130 Hercules, which last month completed its 20th year of Air Force service.

Readers who fly or have flown the Herky Bird should find this month's reading especially interesting. Photographs in this issue pretty well summarize the versatility of this amazing aircraft.

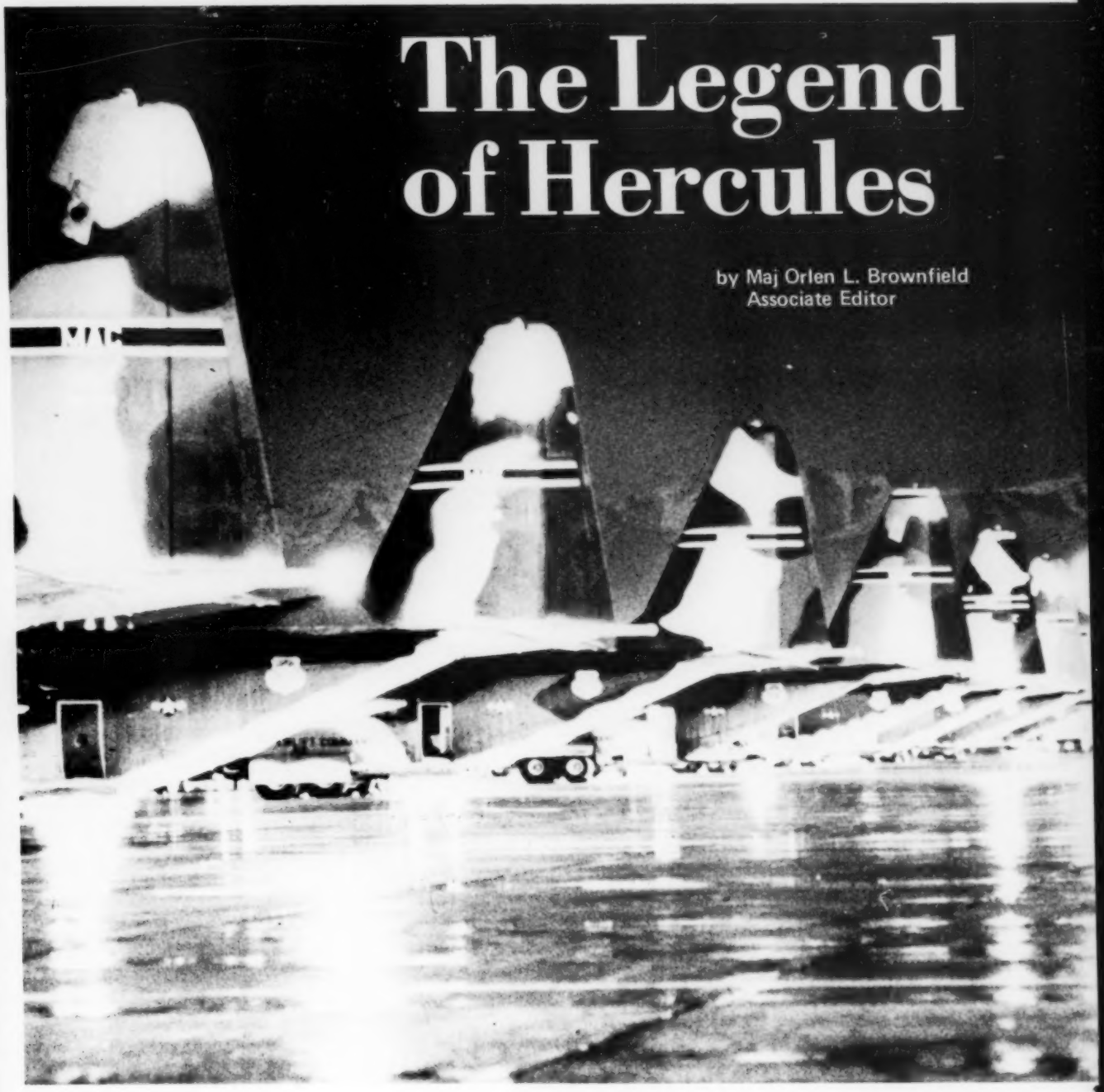
The assignment to MAC of almost all Air Force C-130's in late 1974 added a new dimension to MAC's mission and capability. Although some C-130's had been assigned to MAC previously, and ARRS and AWS were equipped with specialized versions, C-141's replaced the cargo version in the 1960's.

Now the C-130 transport is back—in much greater numbers than before—and the assembly line at Marietta, Georgia, still churns them out, just as it has for the past 20 years. Many feel that the Herky is replacing the Gooney Bird as the most durable aircraft ever built. Few Herky crewmen would disagree.

Another score for the C-130—Hercules is 20 years old.

The Legend of Hercules

by Maj Orlen L. Brownfield
Associate Editor



Last month, on 9 December 1976, the C-130 surpassed the 20-year mark of service to the United States Air Force. But it doesn't look like she's thinking of retirement—and Air Force moguls have no plans to RIF her. A look at ER's shows us a straight string of 9-4's, with a couple of 1-1-1's on top. An enviable report considering the number and the diversity of tasks she's been asked to perform.

I don't suppose that even Leo Sullivan (see separate article) had any idea of the destiny which awaited the C-130 as he taxied out in that

An early "A" model—note the Jimminy Cricket nose.

Ski-equipped Hercules changing the face of icebound outposts.

Navy C-130 on the flight deck of the U.S.S. *Forrestal.*

first "A" model. Sure, the Hercules was *strong*—but who could know that a short haul, tactical bantam rooster would have roles of attack, recon, rescue, strategic airlift, and aerial refueling?

Ski-equipped 130's have made thriving villages of ice-bound outposts in Alaska and Antarctica. The Hercules has dwarfed the flight deck of the aircraft carrier USS *Forrestal.* And the painful, eardrum splitting whine of the Allison/ Hamilton Standard combination has been like music and answered prayers to downed airmen and thousands, perhaps millions, of refugees from floods, earthquakes, and enemy attack over the past 20 years.

Some described the 130 as looking much "like a hen about to squat on an egg." Other descriptions were even less complimentary. A new radome, props, and external tanks have changed the appearance of the bird, though not for the better, many argue. But regardless of its ugly-duckling ground appearance, the Hercules moves with the grace of the great white swan when in its true environment —aloft.

What's in a Name

Hercules was a Greco-Roman mythological hero known

for his great feats of strength. The C-130 is probably one of the most appropriately named aircraft in the Air Force inventory. Even at that, it didn't take TAC and (then) MATS types long to personalize the name, calling it the "Herky Bird." And when the bird first appeared in the MATS airlift wings, a new name emerged—"the MATS fighter"—because of the phenomenal performance of the new "E" model. And for crewmembers who had been flying C-118's and C-121's for "the world's largest airline," it was a whole new ball game. Formation flying, low-level tactics, overhead patterns with 60 degrees of bank, airdrop maneuvers, and short-field takeoffs and landings became the order of the day.

Then in 1964, as things began to get a little testy in Southeast Asia, Hercules was called upon to perform tactical and airlift tasks that would earn for it the name "jet-age Gooney Bird." Whereas the first C-130A had a design maximum gross weight of under 125,000 pounds, the new "E" models assigned to MATS/MAC would make routine flights from the east coast to Alaska and on to the Far East with takeoff gross weights up to 165,000 pounds. As a strategic airlifter, the C-130 had come of age, blazing a trail that would later be followed by the C-141 and C-5 in

Air Force C-130 carrying East Pakistan refugees.

Aerial refueling—Hercules style.

The newest Herky, the C-130H, complete with battle dress.

support of the war effort.

And as MAC's jet fleet began to grow, the Hercules bequeathed North Pac One and Mid Pac to the pure jets. End of story? No way! The "Herk" was needed in SEA to perform its feats of tactical resupply and airdrop into forward areas. But for these the Hercules would need battle dress. Changing colors one more time, the 130 now became "invisible." The camouflage paint and the diversification of the mission prompted another new name—the "Brown and Green Trash Machine." But you smiled when you said it.

"Sneaky Pete," "Spectre," "King," and "Klong"—names and call signs dot the Legend of Hercules, each with a very special meaning. The reliability of the aircraft was usually matched by the tenacity of the crews—a good combination in anyone's book. And if the Air Force ever decided to award battle jewelry to a flying machine, there's little doubt that Hercules would be among the most decorated of the winged beasts.

Still Counting

Though Air Force took delivery of that first C-130 just 20 years ago, conceptual studies really began in 1951. Operating nonstop since 1954, the Hercules assembly line at Marietta, Georgia, has produced more than 1,400 "Herks" for military and commercial operations in 37 nations. In this day and age of "obsolescence on rollout," the Hercules has become a hallmark of ingenuity, application, and design.

Speaking of Records

So what makes the Hercules a legend in its own time? Its sustained superior performance. And the testimony of its records. Here are just a few:

- Largest aircraft to land on or take off from an aircraft carrier—without using tailhook arrest in landing or jet or catapult assistance in takeoff.

- Longest first flight by a commercial aircraft: 25 hours, one minute, on the initial flight of the L-100.

- Largest ski- and wheel-equipped aircraft.

- World's heaviest low-altitude cargo extraction: 25 tons, extracted by parachute just ten feet above the ground.

- Provided the platform for the world's free-fall record when nine Marine parachutists jumped from 44,100 feet.

- World's long distance record for nonstop, nonrefueled turboprop: 8,790 statute miles by an ARRS crew.

Hercules in Uniform

There have been four basic military versions: the C-130A, B, E, and the newest, the H. The new H has a max gross weight of 175,000 pounds and a design cruise speed of 328 knots. It has a new search and weather radar, a "flight operable" APU, and a new air conditioning system, and it is powered by a new Allison propjet, the T-56A-15.

Going Strong, Living Long

Another impressive aspect of the Herky Bird is its safety record, undoubtedly one of the finest in the Air Force.

MAJOR ACCIDENT RATES PER 100,000 AIR FORCE FLIGHT HOURS

Year	Hours	Acdts	Rate
1957	22,632	0	0
1958	79,290	4	5.04
1959	100,457	4	3.98
1960	121,844	1	.8
1961	143,363	4	2.8
1962	175,479	4	2.3
1963	265,331	2	.8
1964	424,034	4	.9
1965	554,079	9	1.7
1966	727,191	16	2.2
1967	656,986	13	2.0
1968	593,976	11	1.9
1969	537,126	8	1.5
1970	504,113	3	.6
1971	487,137	2	.4
1972	480,989	7	1.5
1973	399,605	1	.3
1974	360,549	5	1.4
1975	364,259	3	.8
TOTAL	6,987,441	101	1.44

Statistics prepared by Ted Faber
Figures from U.S. Air Force Safety Center

Some predict that the C-130 will continue to operate well into the 21st century. Imagine that! And they said the Gooney Bird was durable.

Special thanks to Captain Bob Gelpke, 61 MASW, and Mr. Joe Dabney, Lockheed—Georgia for information and photos.

The Way It Was and The Way It Is

One of our old graybeards was clearing out his desk and found a yellowing page entitled *CAA Safety Bulletin, Release 119— Suggestions for the Prevention of Landing Accidents.* There is no date on it but our radiological comparative analysis indicates it was probably written in the early 1940's. It is fairly lengthy but we think you may enjoy the following extractions which are not passé today.

"With the novice, a landing usually is a commitment for better or for worse, made with the closing of the throttle for the landing glide. He frequently is so absorbed with the problem of setting his plane down on the airport and with his hopes that this landing will be a good one that the multitude of other factors essential to safety become either dim or nonexistent. To the experienced pilot, the landing of his airplane has become a matter of routine, but without sacrifice of care or alertness. He knows that his safety, and the safety of others, depends on his obedience to traffic regulations and to the positiveness of his check that he is not in danger of colliding with other aircraft or any hazards which might appear on the airport. Also, he has the ability to recognize a dangerous situation quickly, discontinue the landing if advisable and go around again. Most of these landing accidents are chargeable to the inexperience of the pilot, and since experience can be gained only by passing through the novice stage, they are likely to continue to predominate in accident figures.

"Since landing accidents occur with such high frequency, it would, perhaps, be wise for pilots to check over a few pertinent hints for their prevention and to make sure that they incorporate these suggestions in their landing routine.

"Satisfy yourself that there is no danger of collision with other aircraft in the vicinity before coming in to land.

"Watch your airspeed to prevent a stall and remember that a normal glide should not be stretched.

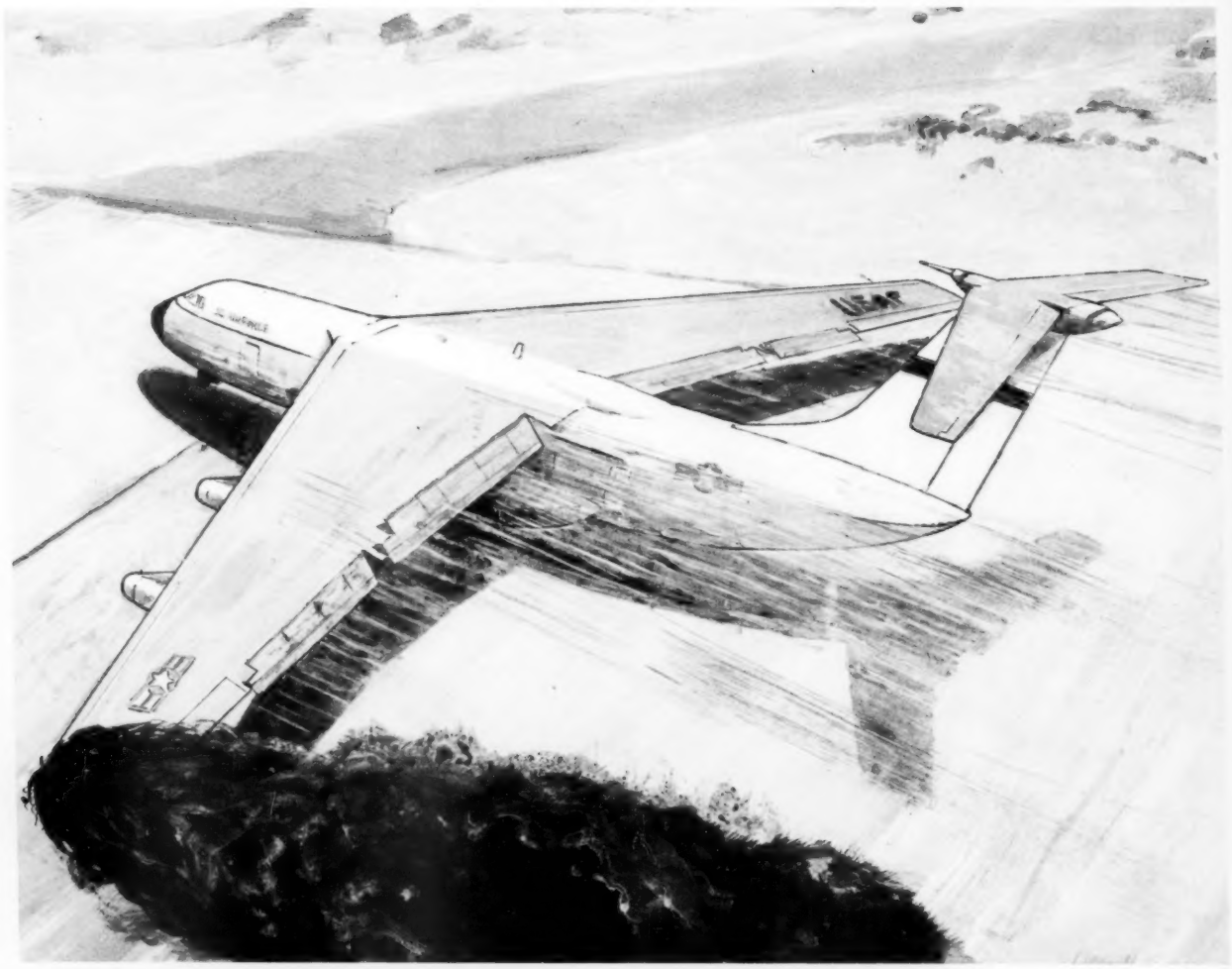
"Avoid too much airspeed and the subsequent possibility of overshooting.

"Avoid overuse of brakes. Don't attempt to turn when in a fast roll. Don't set your brakes to stop your plane in five or ten feet.

"Above all, don't let your approach be a landing commitment. Be on the alert continually, and should any circumstances develop to add uncertainty to your landing, don't wait too long or let pride show you up for a green pilot, but *give her the gun* and go around again. That is what the old timer would do."

—The Cockpit

Illusion of Danger



"... on course, on glide path ... over landing threshold, on centerline." It was the end of a well-executed PAR approach on a VFR day, with four knots of wind and ten-mile visibility. Witnesses watched as the four-engine jet made a normal flare and touchdown.

Seconds later, crash equipment was racing toward the spot where the big jet had disintegrated in a huge ball of flame. The firemen's efforts saved only a few of the people on board.

What had gone wrong? What had turned a normal landing into a tragedy? Patiently, investigators began fitting the pieces together.

In one respect, the accident was unusual: it had been witnessed by competent observers at close range. There was also a good deal of physical evidence to aid in tracing the aircraft's path from touchdown to the point where the wreckage lay. With these aids, the fatal sequence of events became clear.

A beautiful day and a good approach and touchdown; then it happened. Things are not always what they seem.

The aircraft had touched down slightly fast in the normal touchdown zone. It rolled for some 1,500 to 2,000 feet with the nosewheels still off the runway and with no thrust reverser or spoiler deployment. The aircraft then rotated abruptly and lifted off the runway. Witnesses estimated that the pitch attitude had increased to as much as 45 degrees nose-up and stated that they had heard the engines respond as if power was being applied.

The aircraft rolled right, then left. It sank back to the runway. The left wingtip struck first; fire bloomed from the wing as spilled fuel ignited. Then the left main gear, ramp, and right main gear touched down as the aircraft rolled back to the right.

Becoming airborne again, the burning aircraft flew nearly 650 feet, a portion of the left wing missing. It arced to the right across the runway; its right wingtip, dipping down, contacted the asphalt. Now the right wing also burst into flame. Still under high power, the aircraft impacted once again on the right side of the runway, bounced across a drainage ditch, and disintegrated in flame some 500 feet from the centerline.

The facts were clear as to *what* had happened. But the real question was *why*. Teardown and analysis of the flight controls showed no malfunction. The possibility of runaway pitch trim was thoroughly investigated and discounted. In the end, the facts allowed only one tenable conclusion: the pilot had attempted a go-around, over-rotated the aircraft, and lost control in the ensuing stall.

But this answer led only to another and even more baffling question. Why would the pilot have attempted a go-around after a normal touchdown on a dry runway in good weather? In all probability, the answer to that question will never be certainly known—but there is an interesting possibility.

The runway in question slopes upward to a moderate degree, but the slope in the first third of its length is markedly greater than in the last two-thirds. In such circumstances, many pilots have experienced the almost overwhelming illusion that the crest of the runway ahead of them is, in fact, the end of the runway. Often this leads to no more than hot brakes and a feeling of acute embarrassment when the remaining runway finally comes into view. This time, it may have led to disaster.

Other factors in the accident point toward this conclusion. The average experience of the rated crewmembers was low, the final approach was slightly hot, the aircraft was heavy, and there was a slight tailwind.

The landing gross weight of the aircraft brings up another point. The aircraft endurance as shown on the flight plan was nearly 11 hours—but the duration of the planned flight was *less than two hours*! At the previous stop, the crew had deliberately loaded the aircraft with far more fuel than was required for the flight, with even the most pessimistic combination of weather and alternates taken into account. As a result, the fuel on board at landing was in excess of that desired for such a short flight—triple the amount which would have been on board had the crew followed normal procedures.

A smaller fuel load might have made another and even more significant difference. With fuel planned for the most reasonable alternate, the approach speed would have been nearly 30 knots lower.

The reality of this accident is the charred wreckage, the loss of life and the human tragedy. Reality is the cold phrases of the accident report.

And reality is also the consequences that can result from even a minor lapse in judgment.

Decompression Sickness—

It Can Make Your Blood Boil

Pilot, navigator. I'm starting to get some pretty bad pain in my left knee."

It was a C-141 simulator mission. The instructor had just given his students a rapid decompression at FL 370, and the aircraft commander had started a slow descent while he had the crew check for structural damage. Now the instructor, acting as the navigator, was simulating a case of the bends.

"Okay, nav. I'm slowing the rate of descent."

The pilot's reply was startling. Did he say *slowing* the rate of descent?

"It's really getting bad now, pilot. And I'm starting to get some pain in my back," urged the instructor. Then he watched in amazement as the pilot leveled the simulator at FL 310 and eased it into a *climb!*

Apparently, the lessons this AC had learned in physiological training hadn't stuck with him. As the instructor repeated his experiment with other aircraft commanders, it became clear that many of them had no idea of what caused the bends or what to do about them.

This incident was real, as was the recent case of a MAC

crew who depressurized their aircraft at 25,000 feet to check the pressure door locks. After 45 minutes, both crewmembers who were checking the locks developed pain in their knee joints; the pain disappeared when the aircraft was repressurized. Both men had used 100 percent oxygen during their inspection.

The important point is that decompression sickness such as the bends is not caused by a lack of oxygen but by a decrease in atmospheric pressure. At high pressure altitudes, gases which were dissolved in the blood at sea level become gaseous again. The bends are only one of the possible results; other types of decompression sickness include the "chokes" and neurocirculatory collapse. These conditions most commonly occur at pressure altitudes above 25,000 feet, but they may occur at lower altitudes and can be aggravated by physical exertion.

In any case, the proper treatment for decompression sickness is to increase the ambient pressure. AFR 60-16 spells it out: Descend as soon as practical and land at the nearest airport where medical assistance is available.

It's important to remember that the use of oxygen is not enough by itself to alleviate the symptoms of decompression sickness. And don't confuse the pain typically encountered during a rapid descent, such as ear and sinus blocks, with the pain of the bends.

Finally, avoid prolonged exposure to high cabin altitudes when possible. Your body is a lot like the superprofessional we'd all like to be—it performs best under pressure.

Thanks to Capt Thomas A. Lynn, HQ MAC Life Support Division, for contributing information for this article.

Captain Rush

Captain Blasberg

GOOD SHOW

Capt Dean R. Rush and Capt Donald A. Blasberg, both assigned to Shaw AFB, South Carolina, and attached to Det 2, 1402 MAS, were flying a routine T-39 administrative airlift mission to Langley AFB, Virginia. As the aircraft descended through 3,000 feet approximately 15 miles from Langley, the right engine fire warning light illuminated and Captain Rush, the aircraft commander, noticed the right engine r.p.m. decreasing rapidly.

Following flight manual procedures, Captain Rush immediately reduced power on the right engine. The fire warning light remained illuminated; Captain Rush shut down the engine, and Captain Blasberg pulled the right engine T-handle and activated the fire extinguishing agent.

Suddenly, the *left* engine fire warning light illuminated and the left engine fuel flow began to fluctuate violently. Captain Rush reduced left engine power to 70 percent; the fire warning light went out and the fluctuations stopped.

The crew notified Norfolk Approach Control of the emergency and received clearance to land against traffic on the nearest usable runway. Leaving the aircraft in a clean configuration to make the best possible use of the limited thrust available, Captain Rush flew a straight-in visual approach. He lowered the gear and flaps on short final and completed a successful reduced-thrust, single-engine landing.

Maintenance inspectors found that a faulty diverter valve had directed the extinguishing agent to the left engine instead of the right. THE MAC FLYER is proud to award a "Good Show" to Captains Rush and Blasberg for their competent, professional handling of an extremely critical situation.

Leo Sullivan, the first man to fly a production model C-130, at the controls.

Interview with a Master Test Pilot

At the request of THE MAC FLYER, Julius Alexander, Assistant to the Director of Public Relations at Lockheed-Georgia, conducted an exclusive interview with Leo J. Sullivan of the Lockheed-Georgia Company. Mr. Sullivan has flight tested many of the aircraft now being flown by MAC, including the C-130, C-141, and C-5. In this interview, Mr. Sullivan expresses his views on the flight safety aspects of the C-130.

If you haven't heard of Leo J. Sullivan, then you've either never been checked out in a C-130, C-141, or C-5—weren't listening as some of the veteran crews reminisced over their drinks about "the old days"—or just haven't taken time to become aware of your aircraft's solid historical background.

Sullivan's name is as synonomous with Lockheed as the two-bladed prop once was to the Air Force inventory. Today he is the Assistant to the Chief Engineer-Design for Product Safety, Lockheed-Georgia Company. An impressive title. But not nearly as impressive as the work in which he has been involved since 1950.

Sullivan began his aviation career as a Navy pilot, flying aircraft ranging from seaplanes to fighters. He signed on with Lockheed in 1950 and was the first pilot to fly the production model of the C-130 (tail number 33129), on April 7, 1955. He was the first to fly the C-5 Galaxy—in June 1968, when he was Chief Engineering Test Pilot. He was also the first to fly the C-141, the C-140 JetStar, and the Hummingbird, a vertical takeoff and landing jet aircraft developed for research.

He became assistant Chief Pilot at the Lockheed-Georgia Company in 1952, where he really became involved with one of the most remarkable aircraft in the history of aviation history—the C-130 Hercules. The prototypes of the then somewhat radically designed Herky were built at Lockheed's Burbank, California, plant and test flown there. Sullivan was one of the test pilots in the prototype program and later moved to Georgia where he commanded the maiden flight of this first production Hercules.

Sullivan probably knows more about the C-130 (and the C-141 and C-5) than any other pilot in the world. He has managed to accumulate a fantastic record of accomplishment by applying his own technical expertise, flying ability, and a safety awareness wrapped warmly in a mantle of excellent judgment.

That the C-130 possesses one of the world's most outstanding flight safety records over its 20-year operating period (and it's still in production) is not something that happened by chance. It is a tribute to those who have flown it, and to the aircraft itself. Over this period, the C-130 has compiled an enviable accident rate of 1.48 per 100,000 hours of operation. In 1973, the C-130, in spite of heavy military requirements, chalked up a safety record of 0.3 per 100,000 hours, better even that the .613 for U.S. air carriers.

This interview with Mr. Sullivan reveals some of his thoughts on the aspects of the C-130 and flight safety which should prove useful to all who fly her.

ALEXANDER: In terms of safety, where did it begin with the Hercules?

SULLIVAN: When the C-130 was designed in the early 50's, there was no such thing as a formalized engineering safety program. All engineers had a responsibility for safety in the design of an airplane. Today, there is a more formalized systems safety program effort that goes into the plan for the airplane. This concept of systems safety was first applied on a transport with the C-5. Since the C-5, it has been applied to all aerospace weapon programs as well, including the B-1.

ALEXANDER: How was safety achieved in the Hercules?

SULLIVAN: Lockheed manufacturing, the pilots, and flight engineers made input to design and project engineers on what they felt had to be done with the early models of the Hercules to make a reasonable compromise between safety and an efficiently operational airplane.

ALEXANDER: To what extent does safety influence design changes?

SULLIVAN: Safety plays a major role in design improvement. For example, I was pilot in command in the first ever C-130 accident and this accident led to a design change. On the third flight of the first production C-130, an otherwise routine flight, a fire developed in the number two engine during the landing roll. Prior to landing, fuel had been seen trailing from the engine by ground observers. When reverse was applied on landing, the number two engine nacelle and flap ignited. All crewmembers evacuated the aircraft without injury, but the C-130 sustained major damage. (By the way, the number one C-130, No. 33129, was repaired and is still flying today at Eglin AFB, Florida, and is a gun ship.)

Investigation revealed that the accident was caused when the main fuel supply line to the number two engine became disconnected at the aft side of the fire wall at a quick disconnect coupling. As a result of that accident on the third engineering test flight of the first production C-130, a number of engineering changes were recommended and accomplished.

Test flying a new concept in airlifters is bound to manifest the need for design changes but it does not end with the test flight. Earlier models of the C-130, once they were in operation, became a source for input for design changes. For example, braking has been improved. As models changed, structure of the aircraft, including the landing gear, was redesigned to compensate for increased payloads the aircraft carried. Additionally, many of the internal details from air conditioning to hydraulics have been improved. In any area in which we have found potential problems, there have been design changes. In reality, what has been done represents bringing the models up to improvements over previous models from the standpoint of systems dependability, safety, reliability, and design if there was any need to change them.

ALEXANDER: In light of the many changes on the Hercules, they still look alike, outwardly; do they all fly the same?

SULLIVAN: Procedures for operating these models are essentially the same, but some systems are different. The biggest difference is between the A and B models and the E's and H's. Major differences lie in the flight characteristics. For example, the A model was designed for 110,000-pound takeoff weight and 98,000-pound landing weight. The B was designed for 135,000-pound takeoff weight and 118,000-pound landing weight. The E was designed for 155,000-pound takeoff weight and 130,000-pound landing weight. The H series is a 155,000-pound aircraft for a two and one-half G load factor, 175,000-pound aircraft for a two and one-quarter G load factor, and has a 135,000-pound landing weight. These different weights change the way the airplane flies.

ALEXANDER: Are these differences a problem from a safety standpoint?

SULLIVAN: The C-130 is a safe airplane. We've built a lot of them and most of them are still around. The differences in systems can be a problem, however, if there is the lack of thorough systems knowledge on the part of the crew. Two problems are very conducive to accidents, and unfortunately, evidence of these problems crops up at safety briefings in which I participate. The first is complacency. The second is: crews flying airplanes on what somebody has said, rather than from knowledge gained by studying the flight manual. Both problems become compounded when there is a lack of systems knowledge in relationship to the probability of an accident.

ALEXANDER: What do you mean by crews flying airplanes on what somebody has said?

SULLIVAN: New pilots frequently are taught "this is the way it has to be," without attaining an understanding of what the airplane

April 1955, the first C-130 accident. Sullivan is test pilot and number two engine is on fire.

was designed to do. Flying airplanes on hearsay is not an efficient nor safe way to operate them. Initially flight test results were incorporated in the flight manual which explained how Lockheed and the Air Force recommended the airplane should be operated. Over the years, some of this knowledge has been lost. Unfortunately, there are a few pilots flying on somebody's say so as to how to operate the aircraft.

Likewise, the problem of complacency exists in all sectors of aviation whether it's the airlines, military, or general aviation. If a pilot or other crewmember is complacent, he is willing to take another pilot's or crewmember's word for how something should be done rather than making the added effort of going to the manual.

ALEXANDER: You were about to say something about systems knowledge.

SULLIVAN: Systems knowledge is number one for survivability in an airplane. Lack of system knowledge compounds any problem that is incurred in flight. In these complex machines, when you see a light go on or you see a pressure gauge or any other reaction, if you don't have systems knowledge, you don't know whether to be excited or relaxed.

ALEXANDER: What about experience?

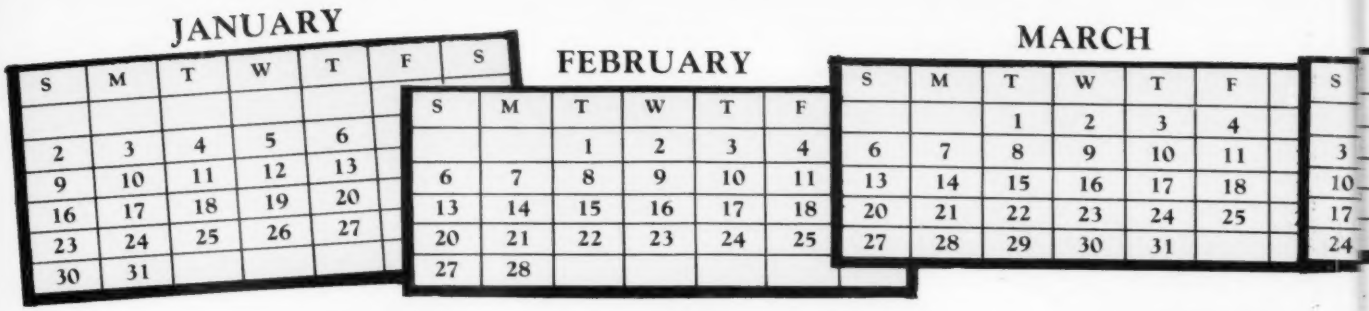
SULLIVAN: Naturally one can assume that with a more experienced crew, the chances of safe operation are better; but training plays a key role in the "building in" of safety. Our philosophy at Lockheed takes this into account. When we train customer crews, they spend weeks learning the systems before they fly. From a safety point of view in the operation of an aircraft, the systems knowledge of the pilot, the copilot, and the flight engineer is the essential ingredient for survivability to live to be an old age crew.

ALEXANDER: Thus far, we have talked about the machine and the man operating it. Are there other factors?

SULLIVAN: Of course. In connection with man and the machine, there's maintenance. The best designed aircraft, flown by the best crew, is an accident trap if not properly maintained. Here again, training is the key. Our C-130's are operated by countries throughout the world. Training our customers is an important ingredient in the C-130's flying safety whether in the tropical climate of Nigeria or the cold of Alaska. We train maintenance crews here at Lockheed extensively so that our customers can realize the maximum benefits the airplane was designed to yield. For example, one of our international customers recently completed a nine-week comprehensive training program in maintenance. They were taught how to efficiently tear down, inspect, and reassemble their C-130's. They thoroughly learned all aircraft systems and avionics and were tested periodically by our training department to assure their government and Lockheed that we taught them well and they learned the systems. At least two weeks of their training was practical application, working on their own airplanes. This was arranged to coincide with the delivery of their C-130's.

Other factors—air traffic control, government regulation, medical implications, etc.—all play a role in safety. Rather than elaborate on all these various areas, I'll summarize by saying that all my experience and involvement in aviation makes me feel strongly that from the position of Lockheed and the Air Force, the key ingredients for flight safety, specifically C-130 flight safety, are: aircraft design, crew training, and maintenance.

I am positive the C-130 is a good . . . no, it's an excellent airplane. Maintained properly with well-trained crews, the systems on that airplane are such that you should never have an accident. It's too forgiving an airplane; believe, me, I know, because I have committed a few errors myself and I'm still here. The tolerances are exceptionally good on the Hercules. Therefore, perfection in the three areas previously mentioned—aircraft design, crew training, inincluding recurrent maintenance training, will not only maintain the fine safety record of the Hercules, it will improve it.



A New Year and So

Planning anything different for 1977? Some crews have come up with definite do's and don'ts, and with good reason.

The customary thing to do on New Years Eve is to make resolutions—resolving to do things a bit differently, capitalizing on the experience of past years. Headliner aircraft accidents that have occurred within this command, other commands, and commercial aviation are among the things that should cause us aviators to be a little more resolute. This list is by no means complete, and you probably have some resolutions of your own. But you might try these as a start.

I resolve not to fly into or near thunderstorms.

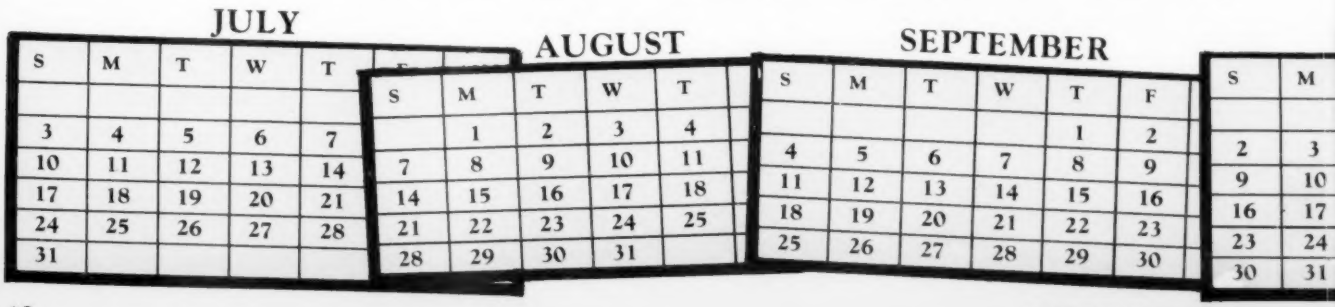
That's pretty simple, but you bet it's important. The cumulonimbus probably represents the most potentially destructive force on this planet, capable of snapping the wings off your aircraft. Thunderstorms near final glide path or departure route have caused wind shear of such a magnitude that airframe, powerplant, and pilot could not cope with it. Chalk up many lives lost to thunderstorms—and then *stay away from them.*

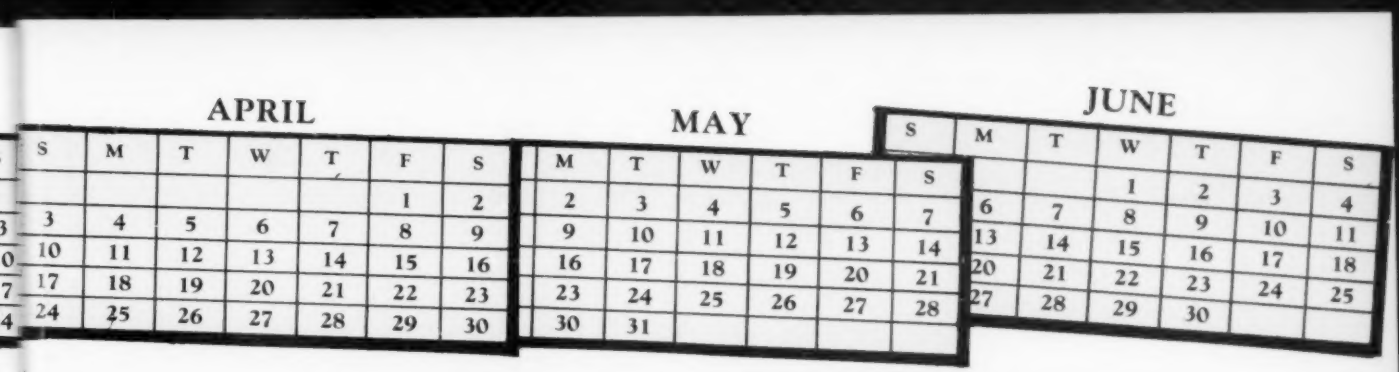
I resolve to use the utmost caution when taxiing, taking off, or landing, especially on other than dry surfaces.

Slipping the surly bonds may be fun, but slipping around on ramps and runways spells trouble. Take for instance the jumbo jet that was blown into a ditch while trying to taxi in not-so-high winds on an icy taxiway, or the multitude of T-39's hydroplaning down or off wet runways, or the ground-looping C-141 of a few years ago. While rain, sleet, or snow may not keep the postman from his appointed rounds, it should give the airman some second thoughts.

I resolve not to let my determination cloud my judgment.

Here's one we don't talk about very much, yet time and time again we see evidence of a pilot's trying to defy the laws of nature and aerodynamics. Contrary to popular belief, pilots don't carry the aircraft on their backs. Airspeed is the secret. How would you react to a wind shear on takeoff—a wind shear of such magnitude as to cause your airspeed to drop below stall? Would you press on with full power even after the bird settled back to the ground? Or suppose you sheared a main landing gear on takeoff roll crossing an arresting barrier—below flying





ome Current Ideas

speed. Would you still try to get the bird in the air? Finally, suppose you botched a go-around and dragged a wing tip, setting it on fire. Would you firewall the throttles, determined to get the beast airborne? You probably answered "no" to all these questions. But these situations aren't hypothetical. They actually happened.

I resolve to use the checklist religiously.

Sounds trite, huh? Have you ever missed a checklist item? No biggy, you probably thought. Well, check with the many crews who missed a couple of words like "pitot heat" or "boost pumps" or "landing gear." Those who lived through their omissions will tell you—checklists are for pros.

I resolve to make sure that all essential equipment is operational before takeoff and to take positive action when equipment fails in flight.

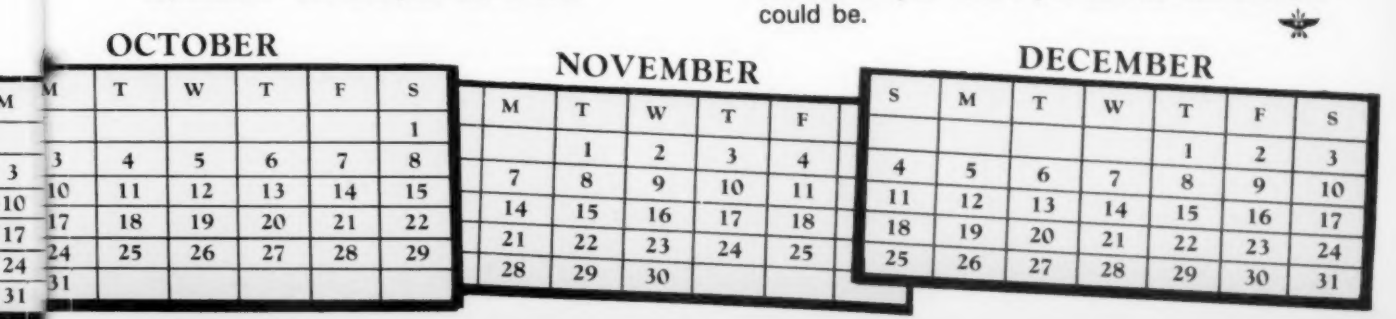
Does that apply to something as simple as weather radar? It does if you're going to be flying in an area of forecast thunderstorms. How about a sick ASN-24? Sure, if your route is going to skim a buffer zone or tax the fuel on board to the limit. Does it mean really *knowing* your aircraft and how equipment failure can affect its capabilities? You bet your life it does.

I resolve to get the airplane back on the ground immediately when things really start coming unglued.

If you've got time to do an extensive analysis of the situation and get some expert advice, then that's the only way to go. But when the distance between the rock and the hard place approaches zero, he who hesitates is very likely to be lost. You didn't hear much about the crews who faced situations like transmission oil loss in a helicopter, or one engine dead and one dying in a T-39, or an uncontrollable wing fire on a big transport. All these incidents had happy endings because the crews immediately performed the appropriate critical action item: Park the airplane.

I resolve to be aware of terrain clearance during every second of every flight.

This resolution needs to be renewed again and again until it becomes an ironclad, unbreakable habit. Any distraction which diverts a crewmember's mind from the necessity of maintaining terrain clearance can set up a potential disaster—for example, troubleshooting an engine malfunction while the multi-engine jet aircraft descends into the ground. Sound incredible? It actually happened, not long ago—*in day VFR conditions!* For most of that crew and their passengers, it's too late to develop that lifesaving habit. It's not too late for you—but if you wait till next week, it could be.



They haven't gone as far as they can go, but folks at Kansas City Center provide the best weather avoidance system in the country. Give them a call the next time you fly their way. You'll be glad you did.

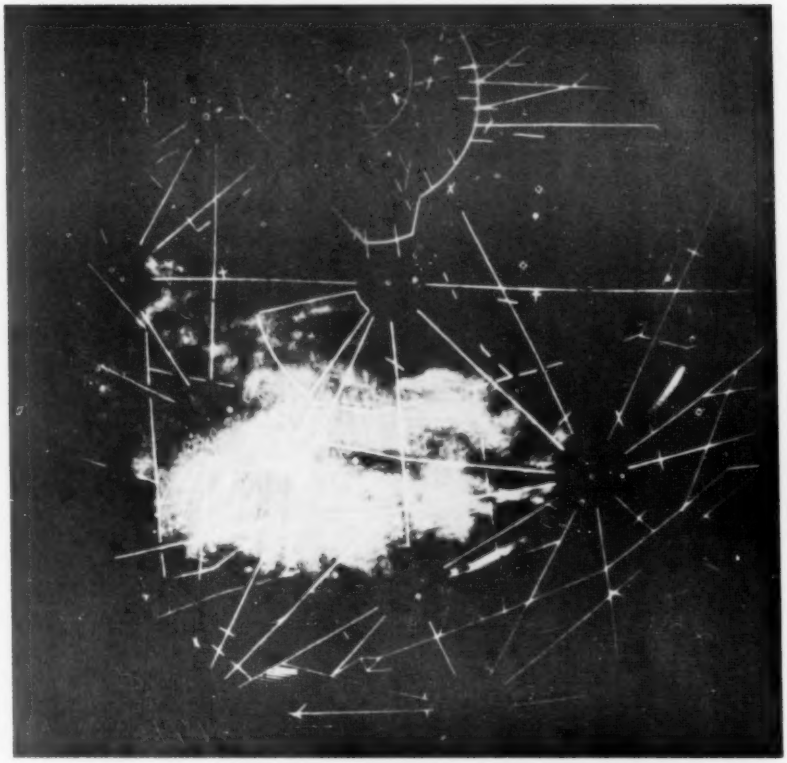
Everything's Up-to-Date in Kansas City

Nothing in the foreseeable future is likely to make flying through areas of severe weather a soft touch, but the good news is that flying through the Kansas City Center area can give you a leg up on avoiding the worst of it.

Kansas City Center stands unique in its equipment, utilization of personnel, and services rendered to aircraft. No other center in the country is equipped to cope with the weather in such a manner.

While most ARTCC facilities provide weather information to aircraft upon request, their primary responsibility is to provide separation between aircraft. These controllers relay PIREP's of hazardous weather within their areas and weather radar returns when requested. But occasionally things within the control room become hectic, and controllers may not have the time to automatically provide weather information to the aircrews that are starting to bounce around at altitude.

Not that Kansas City Center controllers don't sometimes find themselves swamped, too. The difference is that, unlike other centers, the one at Kansas City is manned not only by a team of ARTCC controllers, but an extra team of seven Air Weather Service and National Weather Service forecasters. This team of forecasters continually monitors the airspace within the ARTCC's control area for signs of thunderstorms, turbulence, or icing. They do not control aircraft, but they pass on weather information in the form of advisories to the ARTCC controllers. Better yet, flights can get first-hand weather reports on Kansas City Metro UHF 369.9.



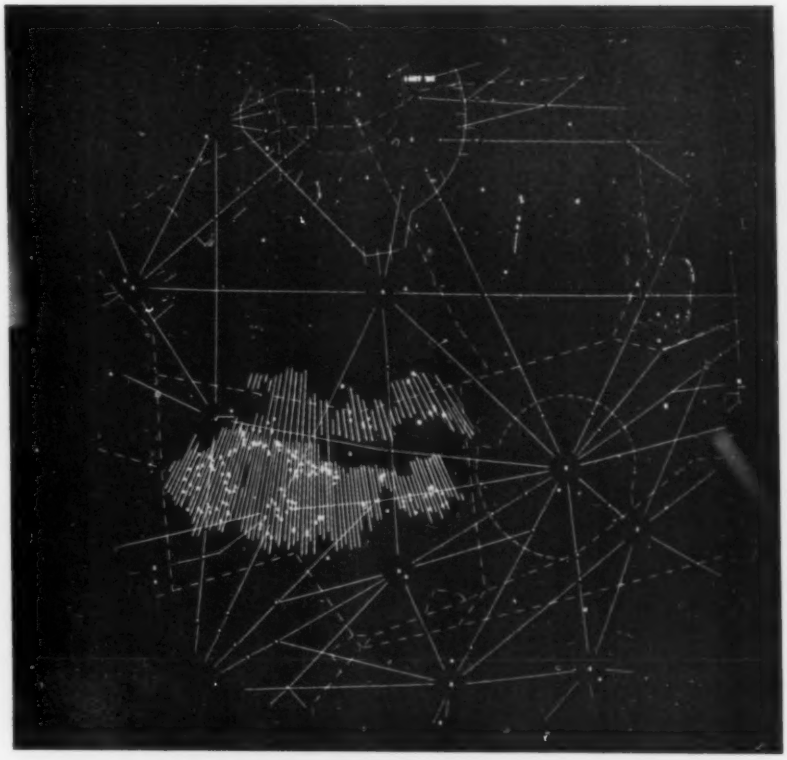
This is how weather appears on an ARTCC controller's scope without computer processing or circular polarization. Intense weather appears near the center, with less intense echoes in the northwest.

Using a radar display driven by an ARTCC computer, forecasters have the capability to monitor both thunderstorms

by Maj Herbert Weigl, Jr.
Directorate of Field Support
HQ AWS, Scott AFB, Illinois

and aircraft as well as the aircraft's projected IFR flight-planned route for the next 90 minutes of flight. Five transceiver sites enable pilots to contact Kansas City Metro from anywhere in the Kansas City ARTCC area of responsibility. But, while the ARTCC forecaster can provide you with the range and bearing of weather, he does not have the authority to vector aircraft to avoid it. In this respect the ARTCC forecasters are like all other forecasters. They can suggest alternative routing, but only ARTCC controllers, (not ARTCC forecasters) can provide vectors around the weather.

There's nothing drastically different about the radar sets used by these ARTCC forecasters. They're basically the same type as those used by the controller who gives you vectors. The utilization of forecasters is obviously the major factor in this relatively new system.



This shows the same weather picture utilizing the controller's computer processed display. More intense cells are depicted by H's and less intense areas by long, parallel lines. (The H's are difficult to see in these photos; most look like dots.) Aircraft returns are not depicted on this photo, although the scope is capable of painting them simultaneously with weather. Rainfall rate from echoes depicted here is less than one inch per hour.

Other Centers

But Kansas City Center is not the only one that can provide important weather information. As mentioned earlier, ARTCC controllers at most centers in the United States have similar radar scopes and can provide weather information upon request—as long as it doesn't interfere with their primary mission of providing separation between aircraft. And you, as pilot, can improve the quality of assistance received by requesting thunderstorm information immediately upon contacting ATC. You'll receive better service by letting the controller know what deviations you require or will accept. And don't forget, pass PIREP's to the controller immediately for the benefit of other aircraft in the area.

Here are several other bits of information that should help you fly more safely when the weather is not quite as you would like it:

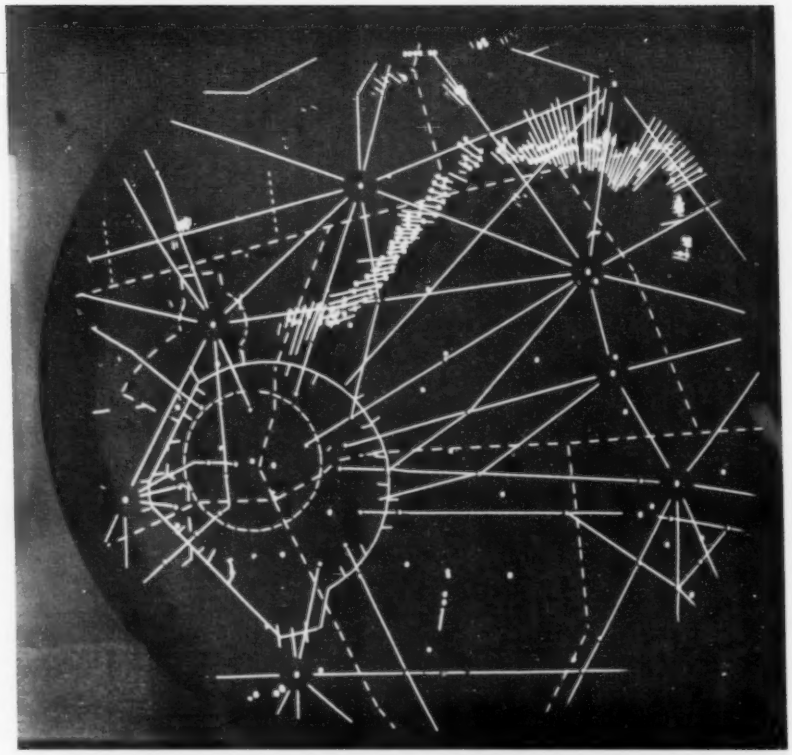
• ATC radars can "see through" thunderstorms much better than most airborne radars. Because of its short wave length and limited power, the pulse of an airborne set isn't always strong enough to penetrate precipitation in a severe storm and let you see what's on the other side.

• ATC radar cannot provide as much in-

depth weather information as the radar set at your base weather station. The height of a storm cannot be measured by the ATC radar, and the definition of storm intensity measurement is not as great.

• Precipitation tends to "mask" aircraft, causing problems for ATC controllers. To combat this, features have been developed that allow ARTCC controllers to eliminate precipitation echoes. One such feature is Circular Polarization, a method whereby controllers can flip a switch and eliminate all but the heaviest precipitation areas. This feature is often used by controllers in terminal areas and sometimes by ARTCC controllers responsible for aircraft at altitudes below the positive control airspace. The use of this mode is usually unnecessary; however, its use could cause problems for aircrews who find themselves in weather and fail to request weather avoidance assistance from the controller.

• A secondary radar system, relying solely on an aircraft's transponder, is sometimes used by ARTCC controllers responsible for positive control airspace. Unfortunately, this system also does not detect or display weather echoes. But under normal conditions, controllers will use a radar mode that does provide weather returns.



A different weather pattern, a squall line, extending from the center to the northeast, is depicted using the controller's computer-processed display. Thunderstorms with a rainfall rate of five inches or more per hour are shown by two H's connected by a line. Note the less intense thunderstorms at far right, depicted only by parallel lines.

There's nothing routine about flying in weather, and misuse or nonuse of available weather assistance can prove as costly as misjudgment in an emergency situation. If you're looking for something called a "routine" flight under IFR conditions, you're not likely to find it. But you can come a lot closer to it by utilizing every scrap of assistance you can muster up—whether you're flying in the Kansas City area or that of Yokota Approach Control.

You'll find him wherever there's an aircraft, and he never goes PCS or takes leave. Within his command are aircrews that rank among the best, and the worst, that have ever flown.

The SOD

by Capt Jerry M. Brewton
Det 4, 37 ARRS
Little Rock AFB, Arkansas

The marshaller raised his hands and began to gesture. Captain Bell released the brakes and the C-130 began to roll slowly. Satisfied that everything was in order, he turned to his student. "Okay, Larry, she's all yours. Don't get in a hurry. Our departure time is one five, so there's no rush."

The big aircraft rolled away and Capt John Lee climbed into his SOF truck and radioed the ops center that Trash 99 was out of the blocks and all was in order.

As the SOF truck pulled away, Grimm arrived. Grimm was the SOD and his long black limousine moved unseen onto Trash 99's parking spot. He stepped out and carefully surveyed the ramp. On the concrete he found a cotter pin, several small pieces of safety wire, and a few drops of hydraulic fluid. He relayed this information to *his* ops center and moved down the flight line to the next parking spot.

"Trash 99, taxiway one for a 1915 controlled departure." Larry Whiteside spoke slowly and distinctly into the microphone.

Ground control crackled their clearance to them. "Trash 99 cleared as filed. Contact departure control as soon as practical after takeoff."

As the C-130 climbed to altitude, Barry Archer, the instruc-

tor navigator, reviewed the low level route that they would be flying. He knew the route by heart, but he didn't want his student, 2d Lt Carl Eller, to get ahead of him. He felt that these routes were really too easy. Maybe today he could get Bell to drop down a little, deliberately get off course, or do something to make the training a little more challenging. As Archer entertained this thought, Grimm's hollow eyes began to gleam. He had monitored all the departures today and, so far, no one had really seemed to need his services. But now, if Bell could be convinced to show his stuff . . . Probably no chance, but a good SOD is always ready, so he contacted his ops center to have a crew bus standing by.

•

"Dammit, I don't have time to go fly," complained Sphere, down at the local rescue unit. "I'm up to my neck in paperwork. See if one of the other pilots will take the mission for me so I can get these training records straight."

As a helicopter pilot, Don Sphere was highly regarded. He'd graduated at the top of his pilot training class, proven his ability in combat as a gunship pilot, and received his share of praise for his performance as training officer since joining the missile support helicopter detachment. When Sphere had first arrived, Grimm had monitored him closely. After all, it seemed only natural than an old gunship pilot would find missile support flying too dull for his spirit. During Sphere's initial orientation, Grimm had watched him preflight, listened to his briefings, and evaluated his skill and attitude as a pilot. Sphere had flown each mission as if he knew that the SOD was watching over him—he was as precise in performing his duties as Grimm was in performing his. Grimm had finally decided that Sphere was not ready to join the Dark Wing. Still, he'd kept an eye on him and now, with Sphere's complaint about not having time to fly, the gleam in Grimm's eyes had grown brighter. Perhaps today Sphere could be enticed to follow him on his dark mission.

Grimm was ageless. He'd flown every aircraft in the inventory and he was always included on the first flight when new weapons systems were being checked out. He didn't need an invitation—the duties of the SOD required that he know every aircraft. But his knowledge did not end with matters pertaining to flight. He was an expert in all phases of maintenance and as a ground safety officer he would have pleased any commander with his knowledge of proper procedures and his ability to detect violations.

Grimm moved continuously in performing his duties—from the flight line to the hangar and from the hangar to the club. His energy was unending; at times he could be found loitering outside the stag bar waiting to see if anyone needed his services on the way home after "last call" had passed. He was the SOD, the Supervisor, and he did not neglect his duties even for a second. Anyone who followed his leadership joined the Dark Wing, but the Dark Wing always seemed to be undermanned. There was a critical shortage of pilots, navigators, flight engineers, maintenance personnel, and office workers. Although few joined the Dark Wing willingly, no one ever broke his allegiance once having become a member.

Sphere's mind wandered during his mission briefing. He was behind on his additional duties and had hoped to spend the afternoon catching up on them. Once the training records were reviewed, he had to complete his monthly schedule reliability report and then maybe get in a few holes of golf before sundown.

As he checked the flight authorization block which said "Hazards to Flight" he was vaguely aware of someone saying, "The 130's are working the low level routes today." Just another routine run to the missile sites—fly out, drop off the tool box, and come home. With a little luck he'd still make the first tee by 1700.

Sphere ran a quick preflight, briefed his copilot, and was calling for a taxi in a matter of minutes. Neither the pilots nor the maintenance crew were aware that this mission had a passenger aboard. If anyone had seen him they would have mistaken him for a shadow. Grimm's presence was never known un-

til his services were needed.

As the chopper taxied out Grimm called his ops center. "Dispatch the crew bus," he commanded.

•

"I've been talking to Captain Archer and he thinks that this route is too elementary for a man of Lieutenant Eller's ability," Bell announced as he took control of the aircraft. "We're going to see if he can keep the right heading with old Trash 99 skimming the treetops."

With that he pushed the nose over and the Hercules was soon cruising a mere 200 feet above the ground. At this altitude the jobs of the pilots and navigators became more demanding. Bell had flown many low level missions in SEA, and he felt that they should be included in the training syllabus. The school had what it called "low level training" but no one flew at 500 to 1,000 feet in an actual tactical low level situation. The sky was clear and there were no abrupt terrain changes, so for a few minutes Bell was going to let the students see what low level was really all about. This wasn't the kind of thing that one discussed during happy hour, but these were good students and no one had to tell them that.

"Hey, Captain, the hydraulic pressure is fluctuating a little." Sergeant Thompson's words brought Bell's eyes to the gauges.

"Thanks, Sarge, I'll keep a close watch on that," Bell replied. In the shadows, Grimm used his cape to conceal the glow now burning in his eye sockets.

•

"It never fails," Sphere groaned as he lifted the chopper from the landing pad. "Once you get airborne, they treat you like a high class taxi. If I hadn't had to divert to pick this guy up, I'd have finished that reliability report by now. At least he could have been ready when I got there. Sitting on the pad and waiting for half an hour when I've got more important things to do. Damn! Damn! Damn!"

As he neared 200 feet Sphere remembered that he hadn't bothered to do a clearing turn before he took off. Oh, well, no one will be flying this low, he thought as he banked right to check for traffic. Then his heart jumped to his throat and his hands froze on the controls as he realized that someone was flying that low—Trash 99.

Grimm threw back his cape and screamed the hideous laugh that only he was capable of. The SOD had done his job once again.

•

A shadowy bus pulled up in front of the headquarters of the Dark Wing. Grimm was now visible to all the passengers and as they viewed his grotesque features they realized they were condemned to his command.

"Welcome, gentlemen," he hissed. "I don't have to tell you your duties. They're really very simple. You have just joined the ranks of dead aviators and for eternity you must ponder your mistakes."

As Grimm turned to leave, Sphere found that he still had a voice of sorts and he hissed a question. "Who are you? Your name tag says Grimm, but who are you?"

"Me? Why, I'm the SOD," Grimm answered.

"The what?" asked Bell.

"The SOD. The Supervisor of Dying!" cackled Grimm. "Now you'll have to excuse me. I've got a flight to catch."

ABOUT THE AUTHOR

Captain Brewton is a native of Texas and graduated from the University of Houston in 1970 with a bachelor's degree in Political Science. He was commissioned via OTS in March 1971 and then entered UPT-H. Captain Brewton flew HH-43's for ARRS at Nakhon Phanom, Thailand. He was assigned to Little Rock AFB as a missile support pilot in 1973 and has accumulated over 1,400 hours of flying time—all in light lift helicopters.

C.R. TERROR

"Lemme see, now," C.R.'s forehead wrinkled as he thumbed a rather rusty MB-4. "Set the miles on the outer scale—no—balderdash! Where is that replacement nav?"

A gloved hand tapped the Rotund One's shoulder. "Major Terror, I assume."

C.R. turned to see a very tall, gray-haired gentlemen in a meticulously pressed flight suit complete with military creases. "Uh, yes—uh, Sir."

"Stand at ease, Major. I'm Lieutenant Colonel Error—D. R. Error. I'll be navigating our aircraft this mission," the colonel extended a hand which C.R.

C.R. Terror meets D.R. Error and gets a lesson in grid navigation.

shook. "This young fellow must be our copilot." He turned to Sam.

"Yes, Sir," the Petulant Pilot glanced at the colonel's hat, complete with CB's and lightning bolts. "We call him Sam, Long Suffering Sam."

The Obstinate Observer shook Sam's hand. "Yes, Captain. Pleasure, I'm sure."

"Well, Colonel," the Pompous Pilot began, "in your absence, I've finished most of the form 26—er, having a little trouble with the fuel figures though."

"Tut, tut," the colonel asserted, "we'll simply use the computer flight plan figures—much easier that way." He studied the figures. "After all it's only four plus 12 to Hickam. The fuel looks good to me."

"Ah, yes, Sir," C.R. agreed. "You must be new, Colonel. I don't believe I have observed your presence at any of the squadron activities."

"Quite right, my good man," the cool colonel commented. "I've just arrived TDY from Doverton AFB to help you West Coasters out. I am a bit rusty, though, having done no *real* flying for some time—the burdens of being a wing weenie, you know. But you needn't worry—I've over 3,000 hours at the navigation station as well as some extracurricular flying in the Cessna 150 to the tune of 12 hours, so I'll be able to help you out up front should the need arise."

"Uh, certainly, Sir," the Pensive Pilot was beginning to wish that Blinky hadn't taken leave at this particular time.

•

"I really didn't think an OPREP THREE was appropriate, Major," the colonel said to C.R. after ordering a Mai Tai for himself and a Terrorific 'Tini for the Rotund One.

"I'm not absolutely sure that those ADC toads had their radar properly tuned, after all, my indications were that we were only about 430 feet right of course at the ADIZ, not 31 miles left."

"Heh! Heh!" the Portly Pilot grinned. "They sure threw away a lot of money scrambling those 102's."

"Another contributing factor is that those National Guard G-pullers were probably noncurrent for intercepts."

"Right!" the Agreeable Aeronaut concurred. "Bartender, another round for the colonel and the world's finest pilot!"

•

"Pilot, navigator."

"Go ahead, Sir," the South Pac Slipper of the Surlies answered.

"You may inform the appropriate agencies that we were airborne at 0800 hours Zulu and estimating Pago Pago at 1240," the Nebulous Navigator noted.

"Thank you, Sir. Sammy, would you give that to the command post?"

"Yessir, Boss."

"And Major Terror, I'd like to fly a little grid this leg if you don't mind," said the celestial soothsayer.

"Sure, Colonel, the aircraft is yours."

Sammy looked somewhat shocked. He leaned across the center console and pulled the headset from his left ear. "Hey, Boss. Do you think that's wise? You know the colonel almost got us shot down yesterday."

"Sammy, m'boy," C.R. said, off headset, "I suppose you trust those ground agencies. The colonel and I de-

cided that it was most likely a technical problem with ground-pounder radar. Now don't you worry your little head—us field-graders will take care of you."

Sammy nodded and glanced at his instruments. His HSI was spinning wildly and his peripheral vision caught a gloved hand turning the number two C-12. He swallowed hard enough for C.R. to hear.

The Rotund One keyed his interphone. "Colonel, my slick-winged friend feels a little uncomfortable about flying grid. Perhaps you could present a little didactic discussion on the theory and put his mind at ease."

"Major," the elder aviator answered, "I doubt that I can reduce the sophisticated and technical data to a company grade level. Actually, flying grid is no different than any other form of navigation except that we've reoriented our direction *and* since avionics wizards still have not perfected the free-spinning gyro, we must determine the precession so that we may maintain an accurate track."

"Ohhh," Sammy said, glancing at the instruments. "But why does Major Terror's compass read 270 and mine 317?"

"Don't worry, my inquisitive copilot, if it will make you feel better . . ." The graying Galileo reached for the knob on his panel and began to twist.

Sam noticed his boss's HSI spinning wildly, finally stopping on a reading approximating 317.

"That better, Captain?"

"Uh, yes, uh, Sir," Long Suffering Sam responded in a rather nervous voice.

•

Sammy was comforted by the colonel's apparent confidence, yet something seemed to be missing.

His Bulgy Boss had just returned from a comfort stop with a fresh cup of coffee when Sam realized that he hadn't heard the whistle of the sextant signaling a celestial observation for more than an hour.

"Hey, Boss," Sam leaned again across the console. "Isn't he supposed to be taking a heading shot every half hour or so?"

"Sammy, Sammy, whatever will I do with you?" C.R. spoke in fatherly tones. "The colonel took three heading shots and applied a correction via the latitude set knob. We both agreed that to continue such nonsense would only be extra work and, with the next long leg on to Christchurch, it's only good management for me to allow the colonel to save his energy."

"Yessir," Sammy nodded. "But the regs say—"

"The regs are for beginners—not us old heads. Now you just be a good copilot. Lemme see that AIREP and you take a break. I'll assume your duties while you contemplate the multifarious aviation experience that surrounds you!"

"Yessir," Sam said sheepishly.

C.R. transmitted the AIREP and shortly airways was calling back. "MAC 40335, confirm your present position winds. Are you sure that's 400 degrees at 335 knots?"

"That might be a grid wind, Sir. Let me check with my navigator." C.R. turned to Colonel Error. "Sir, they want a confirmation on this wind—400 degrees at 335 knots. Is that correct?"

"Oh, goodness," said the colonel, studying the form, "I got our call sign in the wrong place again. Our actual wind was . . ."

Sam shook his head.

•

C.R. extracted an Egyptian Oval from his cigarette case and inserted it into an ebony holder. Across from him Sam was nervous. The thunderstorm the colonel had driven

them into was behind them, along with the two and a half G's they had experienced, but the flight was nearly four and a half hours old and still no contact with Pago.

"Major, we're about a half hour out of Pago Pago," the Celestial Seer announced. "I'll be coming out of grid and lining you up on a long final for runway zero five."

"Yessir, Colonel, you've done it again!" C.R. turned to Sammy. "See, I told you not to worry."

Sam fiddled with the radios. "Sir, I can't raise Pago on any frequency or navaid and it's been hours since I've talked to anyone."

"Probably that lightning strike." The Arrogant Aeronaut seemed a bit nervous now. "It could have knocked out our radios."

"Gentlemen, do not fear," D.R. Error spoke up. "I have that bit of southern paradise on the APN-59. You're about to be treated to one of my famous ARA's; so just fly my heading, and I'll put us safely on centerline."

C.R. relaxed a bit. "It sure is good to have a gentleman of your talents on board, Sir."

"Thank you, but it's all in the job," the confident colonel remarked. "Now, turn to a heading of 160; that will put us on base leg with a nine-mile final."

"I dunno, Sir." Sammy was peering out into the blackness. "I don't have a visual on the field."

At 8,000 feet on a heading of 160 the Starlifter entered a thick cloud deck.

Minutes later, the middle-aged Magellan called, "You're nine miles out; turn to a heading of 050—that should put us on centerline. Begin descent in one minute."

C.R. rolled the big jet into a 40-degree bank and then turned, smiling, to Sammy. "Isn't it super, Sammy! We're making an approach without any outside help!"

"Yessir, Boss," Sammy was still peering into the darkness, "But, I sure wish we knew what the weather was and the landing runway—"

"Nonsense, m'boy. Why, we'll—"

"Hold it, Sir. I've got the field at two o'clock!" Sam shouted.

At 300 feet, the Acrobatic Aeronaut rolled into a 50-degree right bank and headed for the lighted runway.

Sam noted that his compass was reading around 100 degrees. "Sir, I don't think that's runway zero five."

"The lightning, my son," C.R. feigned confidence, "the lightning."

•

As the Errorific Trio boarded the crew bus in the mist and rain, the driver turned to C.R., "We sure weren't expecting you. Where can I take you?"

"Merely take us to operations, and we'll file our flight plan for Christchurch."

"That right?" the old driver remarked. "We've never had a C-141 file a Wake-Christchurch flight plan."

"Excuse me, gentlemen," the nervous navigator announced, "I must get something from the aircraft . . ." He departed the crew bus.

"No, driver, not Wake-Christchurch — Pago - Christsake . . ." C.R. broke off in mid-word, noticing the disappearing D.R., "Sammy, you don't suppose . . ."

Quick Stoppers

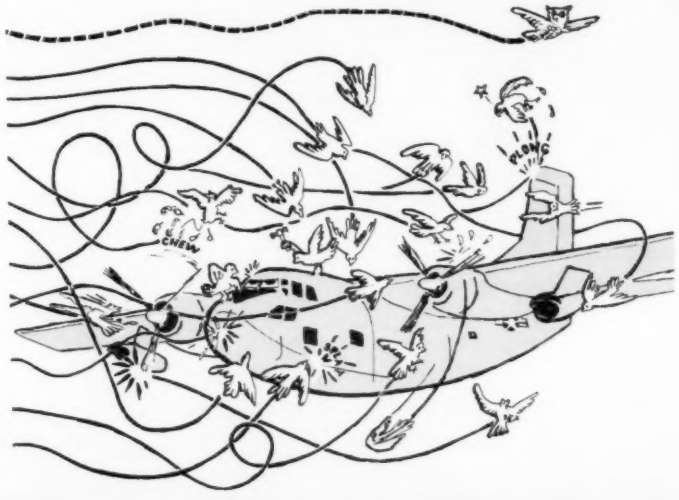
Hot Starter

The Starlifter was climbing out of an overseas base with power set at NRT when the number one starter valve open light illuminated. Engine instruments showed no other abnormal indications, so engine operation was continued in accordance with the Dash One. But 15 seconds later, the number one fire warning light illuminated. The crew shut down the engine with the fire handle; the light went out after discharge of the extinguishing agent.

Upon completion of an uneventful emergency return and landing, the Starlifter crew found that the starter valve had indeed come open. With the big TF33 at 91 percent N1 rpm, the starter overheated and burned a three-inch by ten-inch hole in the engine cowling.

Provider 250, Boredom Zero

This may be one for the *Book of World Records,* if not for *Sports Afield.* The C-123 was nearing the end of a local training mission and was making an approach at a landing zone near home station. Just prior to touchdown, the crew spotted a flock of pigeons on the LZ, but it was too late for evasive maneuvers. When the encounter was over, approximately 250 pigeons had been permanently grounded. Repairs to the Provider included six man-hours to pound out dents in the skin and 16 man-hours to clean the aircraft.



Not So High-poxia

The four-engine jet, restricted by TCTO to a cabin altitude of 10,000 feet, had been cruising at FL 330 for about four hours when the loadmaster noticed that one of the passengers was apparently hypoxic. The loadmaster immediately administered oxygen, using a walk-around bottle and crew oxygen mask. The passenger's symptoms abated rapidly, and after 15 minutes the oxygen was removed at his request. The aircraft commander advised the operations center of the accident and continued the flight to home station, where a flight surgeon was alerted to meet the aircraft.

Twenty minutes after the oxygen was removed, the passenger suddenly became unconscious. He again revived quickly when oxygen was administered, but this time was instructed to remain on oxygen until final descent. As a further precaution, the aircraft commander descended to FL 220, where a 4,000-foot cabin altitude could be maintained for the rest of the flight.

An examination by the flight surgeon showed no adverse effects—and no apparent cause for the incident. Experts think the passenger, who was a heavy smoker, suffered a mild case of hypoxia while smoking at a 10,000-foot cabin altitude. The condition may have been aggravated by the fact that the victim had been working for the entire day prior to the flight, had not eaten anything that day, and had not slept for 22 hours.

Toxic Oxygen

Are you sometimes tempted to skip that time-consuming oxygen check on preflight? Maybe the following attention-getter, experienced by a C-118 pilot, will change your mind.

The pilot had not checked his oxygen on preflight since his service directives didn't require it. But when he decided to use oxygen, some five hours into the flight, a lungful of choking fumes quickly convinced him something was wrong. He felt liquid on the end of the oxygen hose after disconnecting the mask—and poured out approximately four ounces of *hydraulic fluid* from the hose!

Back on the ground, the oxygen cylinders were removed from the aircraft. They contained another gallon and a half of hydraulic fluid, which apparently had gotten into the cylinders during depot level maintenance.

—U.S. Navy Weekly Summary

QS

Accidental Aerobatics

During a night departure from an island base, the C-141 pilot was running the after-takeoff-climb checklist when he glanced at his attitude indicator and noticed that the aircraft was entering a left bank. Assuming that the autopilot was malfunctioning, he used the turn controller to return the aircraft to wings level and resumed running the checklist.

A short time later, the pilot again noticed the Starlifter beginning to roll to the left. He disconnected the autopilot as the bank angle passed 20 degrees, but hesitated in applying any control input; he suspected a malfunctioning ADI which had been worked on prior to departure. By the time he cross-checked the copilot's ADI and confirmed that the big bird was actually in an unusual attitude, the diving left turn had developed to the point where full aileron and considerable rudder were required to stop the roll. During the recovery, the bank angle got as high as 80 degrees and the airspeed increased 50 knots; the plane lost about 2,000 feet of altitude.

Investigators found that a broken spoiler retract cable and a free-floating spoiler panel had initiated the roll, but that the change in attitude could have been easily controlled if the pilot had not delayed in initiating a recovery.

Bad Vibes

The C-130A crew was troubleshooting an unusual in-flight vibration when they noticed that the number three condition lever was vibrating more than the others. Pulling the number three power lever to flight idle reduced the vibration; shutting the engine down cured it completely.

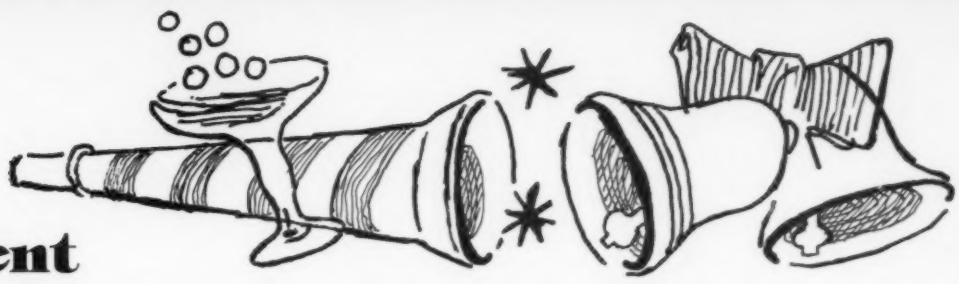
The crew made an uneventful three-engine landing. Teardown of the number three prop revealed a major crack in the number one blade bearing root area. The crack was approximately 16 inches long and extended around three-quarters of the circumference of the blade root.

Talons Blow Tires, Too

For you T-39 types who feel bad about blowing an occasional tire: you're not alone. A flight of four T-38's inbound to a western base found the weather to be a little worse than expected, with limited visibility in rain and standing water on the runway. With no alternates available in the area, the first two pilots elected to land. But even maximum aerodynamic braking and careful wheel braking wasn't enough, and the Talons finished their landing rolls with one flat tire apiece.

Meanwhile, the weather had gotten still worse, and the last two White Rockets diverted back to home base. Unfortunately, the rain had gotten there first. Nobody blew a tire this time—but as one of the pilots lowered the nosewheel to the runway, water splashed into both intakes, causing compressor damage and a dual flameout.

The Year's Big Event



Seems as though the annual MAC Flying Safety Writing Contest barely gets underway before it's over. That's why we are reminding you to get your article in early this year.

How to Enter

Prepare two typewritten, double-spaced copies of your work (fiction, nonfiction, philosophy, technical, or whatever you wish), identified by title only.

Attach a cover sheet bearing the story title, your name and address (military, if you have one), and a short biographical sketch of yourself.

Eligibility

Although anyone may enter the contest, to qualify for the official prizes, winners must be military members or civilians assigned to MAC active or reserve units. But MAC or not, winning entries will be published.

Prizes

Desk sets for the top three winners and walnut plaques for honorable mention winners.

Other Rules

Entries must be original and unpublished. Attempt to keep them between 1,000 and 3,000 words. That's about six to 14 double-spaced typewritten pages.

Mail to:
MAC Flying Safety Writing Contest
MAC/IGFE
Scott AFB, IL 62225

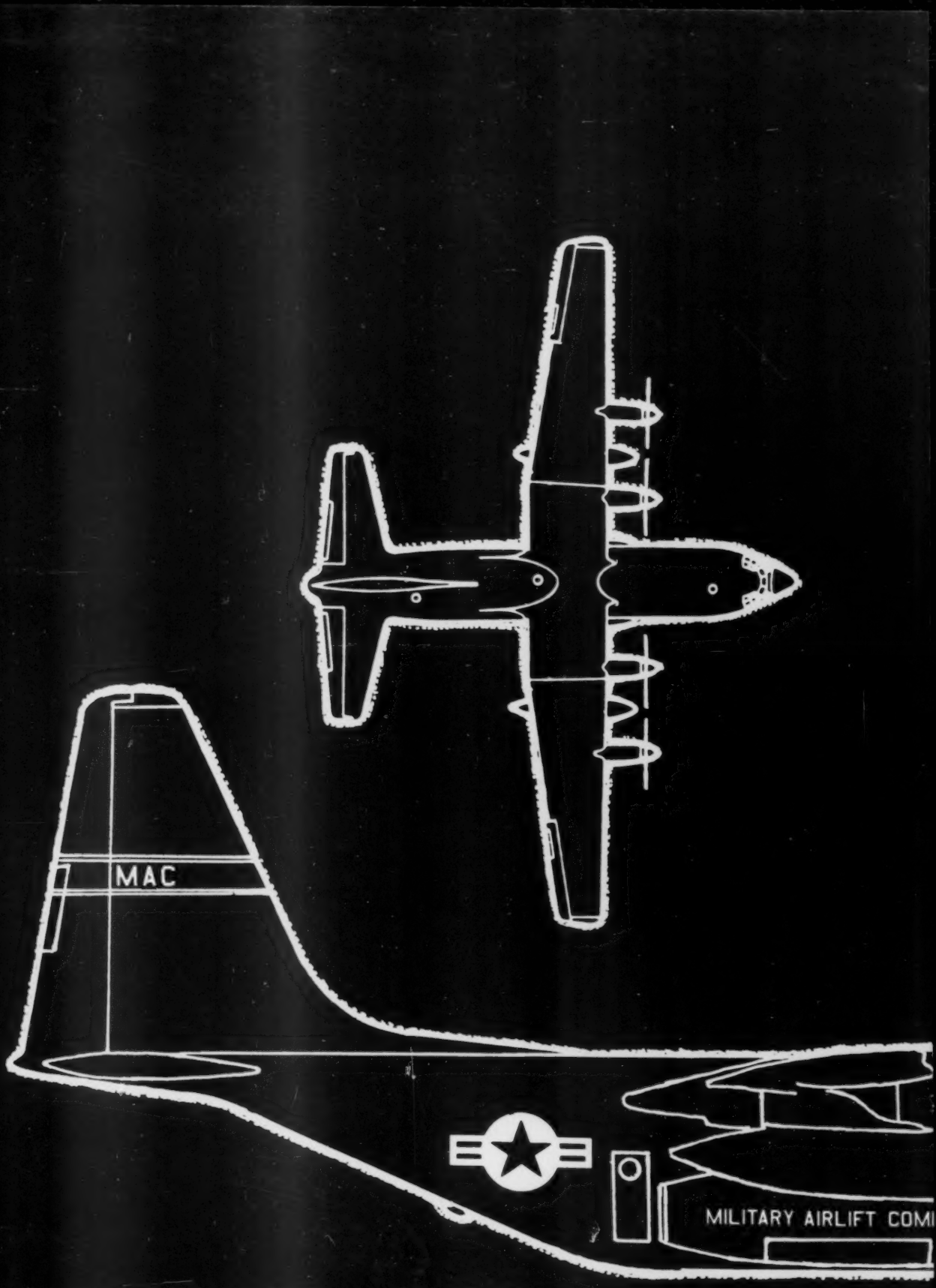
Be sure entries are postmarked no later than 31 March 1977. They must be received at THE MAC FLYER on or before 7 April.

after deadline . . . .

SUPERSONIC STARLIFTER? -- The C-141 was at FL 410 when the autopilot began acting up -- uncommanded vertical inputs. The autopilot was disconnected. Unwanted inputs ceased. Autopilot on. The Starlifter began to yaw, so the AC disconnected the autopilot and yaw damper. Enter Dutch roll. Pitch and bank angles exceeded 90 degrees and the indicated airspeed reached 450 knots. The aircrew regained control at 17,000 feet. Portions of both petal doors and some skin panels from the top of both wings were torn off. More on this later.

ANOTHER T-39 almost met disaster when a gear problem necessitated a diversion through an area of icing. The crew added 15 knots to approach speed to compensate for ice which had accumulated on the aircraft. The AC reduced power for landing and at about 20 feet above the runway the aircraft stalled. Only max power, full rudder, and aileron saved the bird; a scraped wingtip resulted. Investigators found that the T-39's left slat had frozen shut.

U.S. GOVERNMENT PRINTING OFFICE: 1977-765-011/2


MAC
MILITARY AIRLIFT COMI